Gunter, Jason

From: Nations, Mark [mnations@doerun.com]
Sent: Wednesday, June 12, 2013 6:14 PM
To: Gunter, Jason; England, Jason; Yingling, Mark; Wohl, Matthew; 'Kevin Lombardozzi' (kevinl@VALHI.NET); 'John E. Kennedy' (jkennedy@i1.net); Norman Lucas (cityhall@i1.net); robert.hinkson@dnr.mo.gov; Ty Morris (TMorris@barr.com)
Subject: May Progress Report
Attachments: NATL 05-13.doc; National Water Samples_05-23-13.pdf

Jason, attached is the May report.
Mark

THE DOE RUN COMPANY

Remediation Group

Mark Nations
Mining Properties Manager
mnations@doerun.com

June 12, 2013

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
11201 Renner Blvd.
Lenexa, KS 66219

Re: National Mine Tailings Site Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 51 of the Unilateral Administrative Order (Docket No.CERCLA-07-2006-0231) for the referenced project and on behalf of The Doe Run Company and NL Industries, Inc., the progress report for the period May 1, 2013 through May 31, 2013 is enclosed. If you have any questions or comments, please call me 573-518-0800.

Sincerely,

Mark Nations
Mining Properties Manager

Enclosure
c: Jason England – TDRC
Mark Yingling – TDRC (electronic only)
Matt Wohl – TDRC (electronic only)
Kevin Lombardozzi – NL Industries, Inc.
John Kennedy – City of Park Hills
Norm Lucas – Park Hills – Leadington Chamber of Commerce
Robert Hinkson – MDNR
Ty Morris – Barr Engineering

National Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: May 1, 2013 – May 31, 2013

1. **Actions Performed and Problems Encountered This Period:**
   a. Work continued on the development of the Removal Action Report.

2. **Analytical Data and Results Received This Period:**
   a. During this period, water samples were collected at the sampling locations identified in Appendix C of the Removal Action Work Plan where water was present. Copies of the analytical results from the last sampling event are included with this progress report.

3. **Developments Anticipated and Work Scheduled for Next Period:**
   a. Complete work in the Mine Shaft Area.
   b. Continue developing the Removal Action Report.
   c. Complete monthly water sampling activities as described in the Removal Action Work Plan.
   d. Complete air monitoring activities as described in the Removal Action Work Plan.

4. **Changes in Personnel:**
   a. None.

5. **Issues or Problems Arising This Period:**
   a. None.

6. **Resolution of Issues or Problems Arising This Period:**
   a. None.

End of Monthly Progress Report

May 31, 2013

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001

RE: National Tailings Pile - Design and Construction **WorkOrder:** 13051286

Dear Allison Olds:

TEKLAB, INC received 3 samples on 5/24/2013 7:45:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

This reporting package includes the following:

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level

Client: Barr Engineering Company

Client Project: National Tailings Pile - Design and Construction

Work Order: 13051286

Report Date: 31-May-13

Cooler Receipt Temp: 2.0 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	**Address**	3920 Pintail Dr Springfield, IL 62711-9415	**Address**	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	**Phone**	(217) 698-1004	**Phone**	(913) 541-1998
Fax	(618) 344-1005	**Fax**	(217) 698-1005	**Fax**	(913) 541-1998
Email	jhriley@teklabinc.com	**Email**	KKlostermann@teklabinc.com	**Email**	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		4/5/2014	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13
Lab ID: 13051286-001
Client Sample ID: Nat-East
Matrix: SURFACE WATER
Collection Date: 05/23/2013 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	200		**426**	mg/L	20	05/24/2013 19:40	R177547
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.07**		1	05/28/2013 13:19	R177579
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**764**	mg/L	1	05/24/2013 12:35	R177578
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**9**	mg/L	1	05/28/2013 12:23	R177585
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	05/24/2013 10:32	R177513
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.1**	mg/L	1	05/24/2013 16:34	R177518
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	05/24/2013 15:55	88585
Zinc	NELAP	10.0		**384**	µg/L	1	05/24/2013 15:55	88585
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	05/28/2013 16:47	88580
Zinc	NELAP	10.0		**383**	µg/L	1	05/28/2013 16:47	88580
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	**5.79**	µg/L	1	05/28/2013 9:44	88579
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**552**	mg/L	1	05/28/2013 0:00	R177566
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**4.16**	µg/L	1	05/24/2013 12:51	88584

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13
Lab ID: 13051286-002
Client Sample ID: Nat-NW
Matrix: SURFACE WATER
Collection Date: 05/23/2013 14:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**44**	mg/L	2	05/24/2013 19:45	R177547
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.50**		1	05/28/2013 13:22	R177579
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**214**	mg/L	1	05/24/2013 12:35	R177578
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**27**	mg/L	1	05/28/2013 12:23	R177585
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	05/24/2013 10:32	R177513
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**4.0**	mg/L	1	05/24/2013 17:26	R177518
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	05/24/2013 15:59	88585
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	05/24/2013 15:59	88585
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	05/28/2013 16:51	88580
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	05/28/2013 16:51	88580
MS QC limits for Ca and Mg are not applicable due to high sample/spike ratio.								
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	05/28/2013 10:01	88579
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**154**	mg/L	1	05/28/2013 0:00	R177566
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	05/24/2013 13:08	88584

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13
Lab ID: 13051286-003
Client Sample ID: Nat-SE
Matrix: SURFACE WATER
Collection Date: 05/23/2013 13:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	500	S	**1970**	mg/L	50	05/24/2013 20:20	R177547
MS and/or MSD did not recover within control limits due to matrix interference.								
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.03**		1	05/28/2013 13:24	R177579
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**3060**	mg/L	1	05/24/2013 12:35	R177578
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	05/28/2013 12:29	R177585
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	05/24/2013 10:32	R177513
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**< 1.0**	mg/L	1	05/24/2013 17:32	R177518
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	4.00		**14.4**	µg/L	2	05/28/2013 9:24	88585
Zinc	NELAP	20.0		**13400**	µg/L	2	05/28/2013 9:24	88585
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	10.0		**15.5**	µg/L	5	05/29/2013 11:38	88580
Zinc	NELAP	50.0		**13700**	µg/L	5	05/29/2013 11:38	88580
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	10.0	X	**79.1**	µg/L	5	05/28/2013 10:04	88579
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**2050**	mg/L	1	05/29/2013 0:00	R177629
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	4.00	X	**71.5**	µg/L	2	05/24/2013 13:16	88584

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13051286-001	Nat-East	Surface Water	5	05/23/2013 13:50
13051286-002	Nat-NW	Surface Water	5	05/23/2013 14:05
13051286-003	Nat-SE	Surface Water	5	05/23/2013 13:45

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
13051286-001A	Nat-East	05/23/2013 13:50	05/24/2013 8:44		
	Standard Methods 2540 F				05/24/2013 10:32
13051286-001B	Nat-East	05/23/2013 13:50	05/24/2013 8:44		
	EPA 600 375.2 Rev 2.0 1993 (Total)				05/24/2013 19:40
	Standard Method 4500-H B, Laboratory Analyzed				05/28/2013 13:19
	Standard Methods 2540 C (Total)				05/24/2013 12:35
	Standard Methods 2540 D				05/28/2013 12:23
13051286-001C	Nat-East	05/23/2013 13:50	05/24/2013 8:44		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			05/24/2013 9:52	05/28/2013 16:47
	Standard Methods 3030 E, 3113 B, Metals by GFAA			05/24/2013 9:33	05/28/2013 9:44
	Standard Methods 2340 B, Hardness (Total)				05/28/2013 0:00
13051286-001D	Nat-East	05/23/2013 13:50	05/24/2013 8:44		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			05/24/2013 10:43	05/24/2013 15:55
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			05/24/2013 10:17	05/24/2013 12:51
13051286-001E	Nat-East	05/23/2013 13:50	05/24/2013 8:44		
	Standard Methods 5310 C, Organic Carbon				05/24/2013 16:34
13051286-002A	Nat-NW	05/23/2013 14:05	05/24/2013 8:44		
	Standard Methods 2540 F				05/24/2013 10:32
13051286-002B	Nat-NW	05/23/2013 14:05	05/24/2013 8:44		
	EPA 600 375.2 Rev 2.0 1993 (Total)				05/24/2013 19:45
	Standard Method 4500-H B, Laboratory Analyzed				05/28/2013 13:22
	Standard Methods 2540 C (Total)				05/24/2013 12:35
	Standard Methods 2540 D				05/28/2013 12:23
13051286-002C	Nat-NW	05/23/2013 14:05	05/24/2013 8:44		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			05/24/2013 9:52	05/28/2013 16:51
	Standard Methods 3030 E, 3113 B, Metals by GFAA			05/24/2013 9:33	05/28/2013 10:01
	Standard Methods 2340 B, Hardness (Total)				05/28/2013 0:00
13051286-002D	Nat-NW	05/23/2013 14:05	05/24/2013 8:44		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			05/24/2013 10:43	05/24/2013 15:59
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			05/24/2013 10:17	05/24/2013 13:08
13051286-002E	Nat-NW	05/23/2013 14:05	05/24/2013 8:44		
	Standard Methods 5310 C, Organic Carbon				05/24/2013 17:26
13051286-003A	Nat-SE	05/23/2013 13:45	05/24/2013 8:44		
	Standard Methods 2540 F				05/24/2013 10:32
13051286-003B	Nat-SE	05/23/2013 13:45	05/24/2013 8:44		
	EPA 600 375.2 Rev 2.0 1993 (Total)				05/24/2013 20:20

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			**Prep Date/Time**	**Analysis Date/Time**
	Standard Method 4500-H B, Laboratory Analyzed				05/28/2013 13:24
	Standard Methods 2540 C (Total)				05/24/2013 12:35
	Standard Methods 2540 D				05/28/2013 12:29
13051286-003C	Nat-SE	05/23/2013 13:45	05/24/2013 8:44		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			05/24/2013 9:52	05/29/2013 11:38
	Standard Methods 3030 E, 3113 B, Metals by GFAA			05/24/2013 9:33	05/28/2013 10:04
	Standard Methods 2340 B, Hardness (Total)				05/29/2013 0:00
13051286-003D	Nat-SE	05/23/2013 13:45	05/24/2013 8:44		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			05/24/2013 10:43	05/28/2013 9:24
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			05/24/2013 10:17	05/24/2013 13:16
13051286-003E	Nat-SE	05/23/2013 13:45	05/24/2013 8:44		
	Standard Methods 5310 C, Organic Carbon				05/24/2013 17:32

Client: Barr Engineering Company

Work Order: 13051286

Client Project: National Tailings Pile - Design and Construction

Report Date: 31-May-13

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R177547 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						05/24/2013

Batch R177547 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**21**	20	0	105.8	90	110	05/24/2013

Batch R177547 **SampType:** MS Units **mg/L**
SampID: 13051286-003BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	500	S	**2810**	500	1970	167.5	90	110	05/24/2013

Batch R177547 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13051286-003BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	500	S	**2860**	500	1970	177.7	2808	1.81	05/24/2013

Batch R177596 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						05/28/2013

Batch R177596 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20	0	100.0	90	110	05/28/2013

Batch R177652 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						05/29/2013

Batch R177652 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**21**	20	0	103.9	90	110	05/29/2013

Client: Barr Engineering Company **Work Order:** 13051286

Client Project: National Tailings Pile - Design and Construction **Report Date:** 31-May-13

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch R177579 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1.00		**6.97**	7.00	0	99.6	99.1	100.8	05/28/2013

Batch R177579 **SampType:** DUP Units RPD Limit **10**
SampID: 13051286-001B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.08**				8.070	0.12	05/28/2013

Batch R177579 **SampType:** DUP Units RPD Limit **10**
SampID: 13051286-002B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.50**				7.500	0.00	05/28/2013

Batch R177579 **SampType:** DUP Units RPD Limit **10**
SampID: 13051286-003B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.04**				8.030	0.12	05/28/2013

STANDARD METHODS 2540 C (TOTAL)

Batch R177578 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**< 20**						05/24/2013
Total Dissolved Solids	20		**< 20**						05/24/2013
Total Dissolved Solids	20		**< 20**						05/24/2013
Total Dissolved Solids	20		**< 20**						05/24/2013

Batch R177578 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**1030**	1000	0	102.6	90	110	05/24/2013

Batch R177578 **SampType:** LCSQC Units **mg/L**
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**1050**	1000	0	105.2	90	110	05/24/2013
Total Dissolved Solids	20		**1020**	1000	0	101.6	90	110	05/24/2013
Total Dissolved Solids	20		**1040**	1000	0	104.0	90	110	05/24/2013

Batch R177578 **SampType:** DUP Units **mg/L** RPD Limit **15**
SampID: 13051286-003B-DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**3120**				3064	1.88	05/24/2013

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

STANDARD METHODS 2540 D

Batch R177585 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6.00		**< 6.00**						05/28/2013
Total Suspended Solids	6		**< 6**						05/28/2013

Batch R177585 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		**102**	100	0	102.0	85	115	05/28/2013
Total Suspended Solids	6		**95**	100	0	95.0	85	115	05/28/2013
Total Suspended Solids	6		**100**	100	0	100.0	85	115	05/28/2013
Total Suspended Solids	6		**100**	100	0	100.0	85	115	05/28/2013

Batch R177585 **SampType:** DUP Units **mg/L** RPD Limit **15**
SampID: 13051286-003B-DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids	6		**< 6**				0	0.00	05/28/2013

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch R177518 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**< 1.0**						05/24/2013

Batch R177518 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	10.0		**44.4**	43.6	0	101.8	90	110	05/24/2013

Batch R177518 **SampType:** MS Units **mg/L**
SampID: 13051286-001EMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**5.8**	5.0	1.090	94.0	85	115	05/24/2013

Batch R177518 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13051286-001EMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)	1.0		**6.0**	5.0	1.090	97.2	5.790	2.73	05/24/2013

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 88585 **SampType:** MBLK Units µg/L
SampID: MBLK-88585

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	05/24/2013
Zinc	10.0		**< 10.0**	10.0	0	23.0	-100	100	05/24/2013

Batch 88585 **SampType:** LCS Units µg/L
SampID: LCS-88585

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**45.2**	50.0	0	90.4	85	115	05/24/2013
Zinc	10.0		**446**	500	0	89.1	85	115	05/24/2013

Batch 88585 **SampType:** MS Units µg/L
SampID: 13051286-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**45.4**	50.0	0	90.8	75	125	05/24/2013
Zinc	10.0		**454**	500	5.4	89.6	75	125	05/24/2013

Batch 88585 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 13051286-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**44.8**	50.0	0	89.6	45.4	1.33	05/24/2013
Zinc	10.0		**449**	500	5.4	88.7	453.5	1.00	05/24/2013

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 88580 **SampType:** MBLK Units µg/L
SampID: MBLK-88580

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	05/28/2013
Calcium	50.0		**< 50.0**	50.0	0	0	-100	100	05/28/2013
Magnesium	10.0		**< 10.0**	10.0	0	0	-100	100	05/28/2013
Zinc	10.0		**< 10.0**	10.0	0	30.0	-100	100	05/28/2013

Batch 88580 **SampType:** LCS Units µg/L
SampID: LCS-88580

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**48.4**	50.0	0	96.8	85	115	05/28/2013
Calcium	50.0		**1300**	1200	0	108.2	85	115	05/28/2013
Magnesium	10.0		**762**	750	0	101.6	85	115	05/28/2013
Zinc	10.0		**464**	500	0	92.8	85	115	05/28/2013

Client: Barr Engineering Company

Work Order: 13051286

Client Project: National Tailings Pile - Design and Construction

Report Date: 31-May-13

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 88580 **SampType:** MS Units µg/L

SampID: 13051286-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**47.7**	50.0	0	95.4	75	125	05/28/2013
Calcium	50.0		**33200**	1200	32200	79.2	75	125	05/28/2013
Magnesium	10.0	S	**18200**	750	17790	61.3	75	125	05/28/2013
Zinc	10.0		**460**	500	5.8	90.9	75	125	05/28/2013

Batch 88580 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 13051286-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**47.5**	50.0	0	95.0	47.7	0.42	05/28/2013
Calcium	50.0	S	**33100**	1200	32200	72.5	33150	0.24	05/28/2013
Magnesium	10.0	S	**18300**	750	17790	70.7	18250	0.38	05/28/2013
Zinc	10.0		**460**	500	5.8	90.8	460.3	0.13	05/28/2013

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch 88579 **SampType:** MBLK Units µg/L

SampID: MBLK-88579

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	05/28/2013

Batch 88579 **SampType:** LCS Units µg/L

SampID: LCS-88579

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	4.00		**12.8**	15.0	0	85.6	85	115	05/28/2013

Batch 88579 **SampType:** MS Units µg/L

SampID: 13051286-001CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**21.6**	15.0	5.7864	105.5	70	130	05/28/2013

Batch 88579 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 13051286-001CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**22.0**	15.0	5.7864	107.9	21.6153	1.66	05/28/2013

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 88584 **SampType:** MBLK Units µg/L

SampID: MBLK-88584

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	05/24/2013

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 88584 **SampType:** LCS Units µg/L
SampID: LCS-88584

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**13.4**	15.0	0	89.1	85	115	05/24/2013

Batch 88584 **SampType:** MS Units µg/L
SampID: 13051286-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**17.0**	15.0	4.1589	85.4	70	130	05/24/2013

Batch 88584 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 13051286-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**16.1**	15.0	4.1589	79.9	16.9683	5.02	05/24/2013

Receiving Check List

Teklab Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Barr Engineering Company
Work Order: 13051286
Client Project: National Tailings Pile - Design and Construction
Report Date: 31-May-13

Carrier: Timothy Mathis
Received By: SRH

Completed by: Timothy W. Mathis
On: 24-May-13

Reviewed by: Michael L. Austin
On: 24-May-13

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp ℃ **2.0**
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☐	Lab ☑	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		
When thermal preservation is required, samples are compliant with a temperature between 0.1℃ - 6.0℃, or when samples are received on ice the same day as collected.				
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

Custody seal(s) intact on shipping container/cooler.

130511286

Chain of Custody

BARR
1001 Diamond Ridge, Suite 1100
Jefferson City, MO 65109
(573) 638-5000

Project Number: 25860003.06 TLM2 030

Project Name: National Tailings Pile - Design and Construction

Sample Origination State: MO (use two letter postal state abbreviation)

COC Number: NAT 052313

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix: Water	Matrix: Soil		Type: Grab	Type: Comp	Type: QC	Parameters: Water: pH	Total Suspended Solids	Sulfate	Settleable Solids	Total Organic Carbon	Total Metals	Dissolved Metals	Hardness	Total Dissolved Solids	Parameters: Soil								Total Number of Containers	Preservatives / Lab Sample ID
1. Nat-East				05/23/13	13:50	X			X			X	X	X	X	X	X	X	X	X									5	1305 1286-001 Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
2. Nat-NW				5/23/13	14:05	X			X			X	X	X	X	X	X	X	X	X									5	002 " "
3. Nat-SE				5/23/13	13:45	X			X			X	X	X	X	X	X	X	X	X									5	003 " "
4.																														
5.																														
6.																														
7.																														
8.																														

Comments: Invoice to Mark Nations at Doe Run. Results to be sent to Allison Olds (aolds@barr.com) at Barr Engineering, Andrea Nord (anord@barr.com) at Barr Engineering, and Mark Nations (mnations@doerun.com) at Doe Run.
Matrix is surface water.
Metals include Cadmium, Lead, and Zinc.

COC 1 of 1

Project Manager: Ty Morris

Project QC Contact: Andrea Nord

Sampled By: Stephen Moilanen

Laboratory: Teklab

Common Parameter/Container – Preservation Key

#1 – Volatile Organics = BTEX, GRO, TPH, 8260 Full List
#2 – Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide, PCBs
#3 – General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate
#4 – Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By:	On Ice?	Date:	Time:	Received by:	Date:	Time:
Stephen Moilanen	☒Y ☐N	5/23/13	16:00		5/24/13	0620
Relinquished By:	On Ice?	Date:	Time:	Received by:	Date:	Time:
	☒Y ☐N	5/24/13	0740			

Samples Shipped VIA: ☐Air Freight ☐Federal Express ☐Sampler ☒Other: Courier

Air Bill Number:

Custody Seal intact M 5/24/13 2.0 ice

Distribution: White – Original Accompanies Shipment to Lab; Yellow – Field Copy; Pink – Lab Coordinator

C:\Users\sbm\Desktop\Doe Run Chains\Chain of Custody Nat.doc